Oct. 30, 1934. L. G. WILLIAMS 1,979,183

TELEPHONE RECEIVER AND TRANSMITTER ASSEMBLY

Filed Feb. 9, 1933 2 Sheets-Sheet 1

FIG. 1.

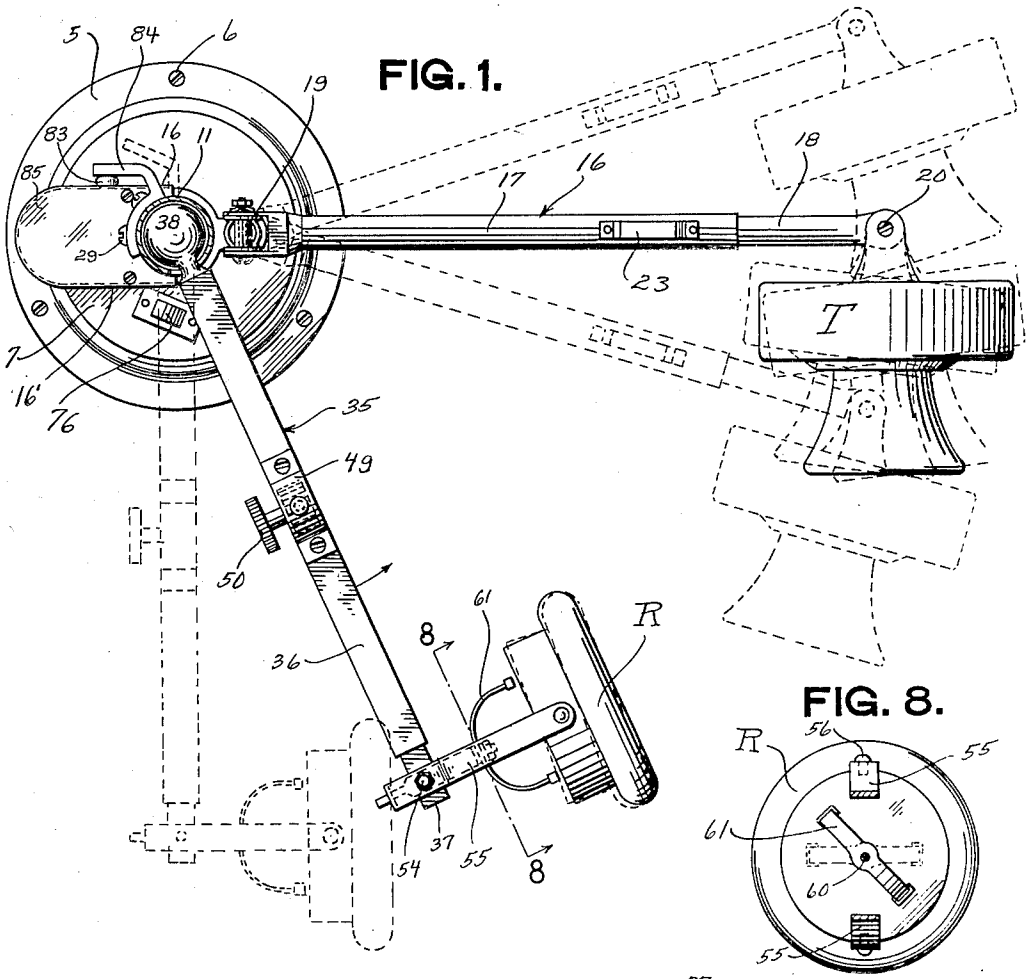


FIG. 8.

FIG. 7.

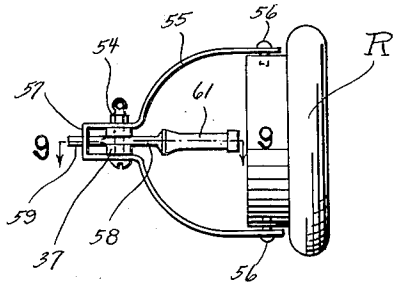
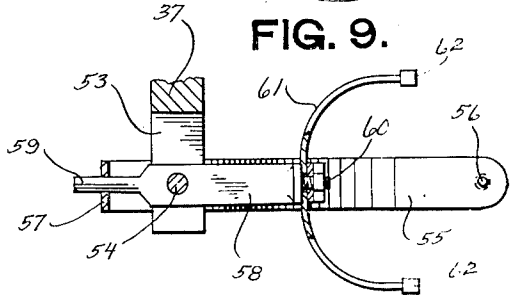


FIG. 9.



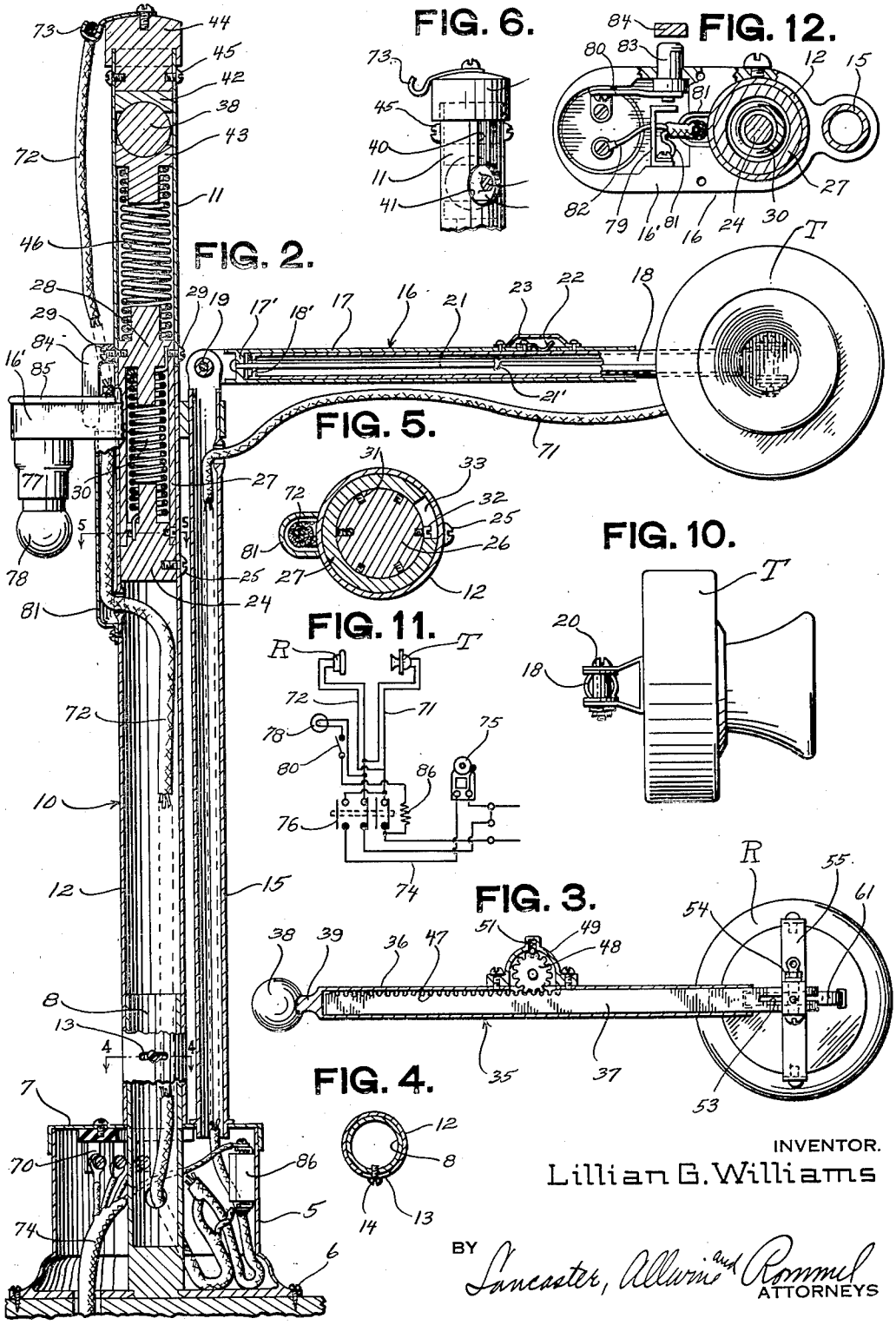
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TELEPHONE RECEIVER AND TRANSMITTER ASSEMBLY

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UNITED STATES PATENT OFFICE

1,979,183

TELEPHONE RECEIVER AND TRANSMITTER ASSEMBLY

Lillian G. Williams, Jacksonville, Fla.

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13 Claims. (Cl. 179—150)

The present invention relates to telephonic instruments and the primary object of the invention is to provide an improved telephone receiver and transmitter assembly particularly well adapted for use in connection with private telephone switchboards.

A further object of the invention is to provide a telephone instrument of this character which will eliminate the necessity of the usual head set, thereby giving the operator freedom for performing other duties while the switchboard is inactive.

A further object resides in the arrangement whereby various adjustments may be had to render the instrument comfortable and efficient, according to the particular requirements of the user.

A further object of the invention is to provide a telephone set embodying readily adjustable transmitter and receiver capable of being adjusted into various adjusted angular relations to one another so as to permit use of the instrument by various operators.

A still further object resides in the novel arrangement of mounting the transmitter and the receiver, with the receiver having means normally spring urging the receiver in one direction and toward the transmitter.

A further object of the invention is to provide a telephone instrument of this character embodying a signal device for indicating when the talking circuit is closed with circuit breaker means for controlling the signal device in accordance with the position of the receiver.

A still further object resides in the novel arrangement whereby a signal light connected in the telephone circuit to indicate when the talking circuit is closed, has its circuit opened upon movement of the receiver to a position for use.

Other objects and advantages of the invention will be apparent during the course of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification and in which drawings:—

Figure 1 is a top plan view of the instrument and showing the upper end of the hollow standard in section, the view showing the receiver in a neutral or normal position when not in use and also showing by dotted lines certain adjusted positions of the receiver and the transmitter.

Figure 2 is a vertical section through the instrument.

Figure 3 is a sectional view taken longitudinally of the receiver arm and showing the manner in which the arm may be extended.

Figure 4 is a detail sectional view on the line 4—4 of Figure 2.

Figure 5 is an enlarged fragmentary section on the line 5—5 of Figure 2.

Figure 6 is a fragmentary detail view of the upper end portion of the supporting standard.

Figure 7 is a detail view showing the manner in which the receiver is mounted upon the outer end of the receiver arm.

Figure 8 is a section on the line 8—8 of Figure 1.

Figure 9 is an enlarged fragmentary detail section on the line 9—9 of Figure 7.

Figure 10 is a view looking at the outer end of the transmitter arm showing the manner of mounting the transmitter.

Figure 11 is a wiring diagram showing the manner of connecting the assembly to an audible indicator such as an ordinary telephone bell or junction box and the arrangement for controlling the talking and ringing circuits, as well as the signal light.

Figure 12 is an enlarged detail section through the supporting standard at a point just above the breaker switch, the cover of the switch being removed.

Referring to the drawings in detail, and wherein similar reference characters designate corresponding parts throughout the several views, the instrument is shown of a type adapted for mounting upon a desk or table top in proper relation to a switchboard and embodies the hollow base 5 which may be secured to its support as by the screws 6. The base 5 is preferably formed with a closed bottom wall and is provided at its upper side with a removable cover 7. The base 5 is preferably of cylindrical formation and has mounted axially therein a mounting sleeve 8 preferably having a solid lower end riveted or otherwise secured to the bottom wall of the base 5 and having its tubular upper portion projecting above the cover 7.

Telescopically fitting over the upper end of the mounting sleeve 8 is a tubular upright standard or post 10 embodying upper and lower tubular sections 11 and 12 respectively. The lower tubular post section 12 is provided adjacent its lower end with a circumferentially extending slot 13 which receives therethrough a set screw 14 which is threaded into the mounting sleeve 8. This slot 13 and set screw 14 are to permit limited rotary adjustment of the post 10 upon the sleeve 8, and also serve as a means for connecting the post to the mounting sleeve.

Extending vertically at one side of the post 10

is a tubular shaft 15 the lower end of which projects slightly through the base cover 7. A shoulder is formed adjacent the lower end of the tubular shaft 15 and rests upon the cover 7 as clearly shown in Figure 2. The upper end portion of the shaft 15 is journaled in a combined switch and bracket 16 adjustably secured to the upper end portion of the lower post section 12. This bracket 16 rotatably supports the upper end of the shaft 15.

Pivotally mounted at one end for vertical swinging movement upon the upper end of the rotatable shaft 15 is a transmitter arm 16 adapted to support at its outer end a standard type of transmitter T. This transmitter supporting arm 16 embodies a pair of telescopically arranged tubular sections 17 and 18 which permit of the transmitter unit T being adjusted laterally toward and from the upright standard 10. The inner end of the arm section 17 is connected by a hinge joint 19 to the upper end of the shaft 15 and this hinge joint is provided with any preferred form of spring washer for proper tension adjustment of the arm 16. The tension applied to the hinge joint 19 is sufficient to hold the transmitter unit in any vertically adjusted position. The tubular section 18 is freely rotatable in the tubular section 17, and the outer end of the section 18 is connected by a suitable hinge joint 20 to the transmitter unit. The hinge joint 20 has its axis arranged at a right angle to the longitudinal axis of the arm 16 so that the transmitter unit may be disposed at various angular positions with respect to the transmitter arm. A movement limiting means is provided for limiting outward sliding movement of the arm section 18 and embodies a slide rod 21 having one end fixedly mounted in an inner end wall 17' which closes the inner end of the arm section 17. The inner end of the arm section 18 is provided with a wall 18' through which the rod 21 slidably extends, and the outer end of this rod 21 is provided with an enlargement or head 21' against which the wall 18' abuts to limit outward sliding movement of the arm section 18.

A tensioning means is provided for retaining the arm section 18 in adjusted position and this embodies a flat tension spring 22 secured externally of the arm section 17 and having a portion extending thru an opening in the arm section 17 so as to bear upon the cam section 18 with sufficient force to prevent ready rotation and longitudinal movements of the section 18 from its adjusted position. A suitable cover 23 may be provided over the tensioning spring 22.

Thus it will be seen that the transmitter arm 16 may swing in a horizontal direction by means of the rotatable shaft 15 and is permitted to swing in a vertical direction upon the hinge joint 19. The transmitter unit T aside from having swinging movement upon the hinge joint 20 may be moved toward and from the standard 10 through the telescopic arrangement of the arm sections 17 and 18, and may also be turned up and down through rotation of the arm section 18 in the arm section 17.

Fixedly mounted in the upper portion of the lower post section 12 and spaced below the upper end thereof, is a cylindrical plug 24 held in position by suitable set screws 25. This plug 24 is provided with a reduced cylindrical plug portion 26 providing an upwardly facing annular shoulder. Rotatable in the upper end of the lower post section 12 is a coupling sleeve 27, the lower end of which encircles the reduced plug portion 26. The closed upper end portion 28 of the coupling sleeve 27 extends into the lower end of the upper post section 11 and is secured thereto as by suitable screws 29. Thus the coupling sleeve acts to axially align the post section 11 above the post section 12 and permits rotation of the upper post section upon the lower fixed post section 12. As will be noted, the coupling sleeve 27 and its upper closed end portion 28 are rotatable with the upper post section 11.

Arranged within the coupling sleeve 27, is a coil spring 30 having its lower end secured in the plug 24 and its upper end secured in the closed upper end portion 28 of the coupling sleeve 27. This coil spring 30 is intended to normally impart a rotating action to the upper post section 11 in a counter-clockwise direction, considering Figure 1. A means is provided for limiting this rotary movement and also adjusting the tension of the spring 30 and this means consists in providing a series of radially arranged threaded sockets 31 in the reduced cylindrical plug portion 26. These threaded sockets 31 are intended to receive a stop screw 32 which has the head thereof projecting into a slot 33 formed circumferentially in the lower end of the coupling sleeve 27. Considering Figure 5, the coupling sleeve 27 is normally urged in a counter-clockwise direction by the spring 30 until an end of the slot engages the head of the stop screw 32. The tension of the spring 30 may be adjusted by placing the stop screw 32 in the desired socket 31. It may here be well to state that to adjust the tension of the spring 30, the screws 25 are removed and the coupling sleeve, together with the plug 24 withdrawn with the upper post section 11 from the lower post section 12.

Adapted for mounting in the upper end of the upper post section 11 is an extensible receiver arm 35 including a square tube section 36 and a solid or bar section 37 which is slidably fitted in the tube section 36. The inner end of the square tube section 36 is formed with a ball 38 which is connected to the tube section by the reduced neck 39. The upper end of the tubular post section 11 is provided with a terminally opening slot 40 at the lower end of which is provided a circular opening 41 of a diameter less than the diameter of the ball 38. The slot 40 permits lowering of the ball 38 into the post section 11 to a point where the ball substantially aligns with the circular opening 41. The receiver arm ball 38 is adapted to be held between a pair of upper and lower sockets or ball seat members 42 and 43 respectively providing a ball and socket joint connection for the receiver arm. Closing the upper end of the post section 11 is a plug cap 44 forming an abutment for the upper ball seat member 42. This plug cap 44 may be secured in position by suitable screws 45. Arranged within the upper post section 11 is an expansion coil spring 46, the lower end of which bears upon the closed upper end portion 28 of the coupling sleeve and the upper end of which acts upon the lower ball seat member 43 for normally urging the member upwardly into frictional engagement with the ball 38. The tension of this spring 46 is such as to yieldably hold the receiver arm 35 in any of its various adjusted angular positions. With the receiver arm 35 so mounted in the upper end of the standard or post 10, the spring 30 acts to normally rotate the upper tube section 11 in a direction for swinging the receiver arm in the direction of the arrow shown in Figure 1.

Referring now to the specific construction of

the receiver supporting arm 35, the solid or bar section 37 is formed with a rack 47 to be engaged by a pinion 48 journaled in a suitable casing 49 carried by the outer or square tube section 36. The pinion 48 extends through an opening in the tube section 36 and is rotatable by the knob 50. A spring urged ball arrangement 51 provided in the pinion casing 49 co-acts with the teeth of the pinion to prevent free rotation thereof and thus retaining the receiver arm in its adjusted extended position. Rotation of the pinion 48 by the knob 50 acts to extend or retract the bar section 37.

The outer end of the receiver arm bar section 37 is longitudinally slotted as at 53 and extended through the arms of this slotted end portion is a pivot pin 54 for pivotal mounting of a yoke 55. The free ends of the arms of the yoke 55 are provided with the usual pins 56 for engagement in the diametrically arranged pin receiving openings of a standard receiver unit such as designated at R. This mounting of the receiver unit in the yoke arms permits limited swinging movement of the receiver about the pins 56 as an axis. The arms of the yoke 55 are joined by the end wall 57. Extended through the slot 53 and also journaled upon the pivot pin 54 is a supporting arm 58 provided at its rear end with a keeper pin 59 which projects through the end wall 57 and connects the arm 58 for swinging movement with the yoke 55. Rotatably mounted upon the forward end of the arm 58 as upon the pin 60, to rotate about an axis at a right angle to the axis of the pivot pin 54, is a U-shaped stop member 61 having the ends of its arms rubber tipped as at 62. This U-shaped stop member 61 is rotatable between the arms of the yoke 55 and acts to limit swinging movement of the receiver R upon the pins 56. This limited swinging movement of the receiver upon the pins 56 may be varied by rotating the stop member 61 upon its pivot pin 60. When the stop member 61 is in a position as shown by dotted lines in Figure 8, minimum swinging movement of the receiver unit will be had, and as the stop member is rotated in either direction toward a plane coinciding with the plane of the yoke 55, swinging movement of the receiver unit will be increased. This manner of adjustably mounting the receiver unit upon the outer end of the receiver arm 35 permits of the receiver shifting during slight movement of the operator's head and yet retain the receiver in proper relation to the ear.

The hollow base 5 provides a junction box for leading a three wire lead into the base for attachment to suitable terminals 70 and from which terminals the wires lead to the respective instruments T and R. The transmitter wire 71 extends from the hollow base upwardly through the tubular shaft 15 and through an opening adjacent the upper end of this shaft for connection to the transmitter unit. Suitable slack is provided in the transmitter wire to permit extension of the transmitter arm 16. The receiver wire 72 extends upwardly through the lower post section 12 and through an opening therein just below the plug 24. The wire 72 may be placed in a suitable hook 73 carried by the plug cap 44 and then extended with suitable slack for connection to the receiver R.

The three wire lead 74 connects the assembly with an ordinary telephone bell or junction box having a bell 75 providing an audible indicator. Suitably mounted in the base 5 is any preferred form of manually operated toggle or lever switch 76 for controlling the talking and ringing circuits and this switch acts in the same capacity as the receiver hook on an ordinary telephone in that it opens and closes the talking and ringing circuits.

A visual indicator is associated with the assembly to indicate when the talking circuit is closed, and circuit breaker means is provided for the visual indicator for automatically opening the circuit to the indicator during the time while a conversation is being carried on. This circuit breaker means for the visual indicator is controlled by movement of the receiver arm 35, the circuit being opened when the receiver arm is moved to its position for use, and being closed when the receiver arm is returned to its neutral or normal position as shown in full lines in Figure 1.

Referring now to the visual indicator means, the bracket 16 is formed with a switch casing extension 16' in which is mounted a depending socket 77 for receiving an electric bulb 78 providing a pilot or visual indicator light. Arranged within the hollow casing 16' is a breaker switch embodying a fixed contact 79 and a spring contact 80 normally spring urged out of contact with the fixed contact 79 as shown in Figure 12. A portion of the wire 72 has three conductors and extends in a channel 81 upwardly through the extension 16' with one of the conductors tapped and connected as at 81 to the fixed contact 79 and one of the conductors connected directly to one of the light socket terminals as at 82. The spring contact 80 is connected to the other light socket terminal. From the extension 16', the two conductors extend to the receiver R. Slidably projecting through one side of the switch casing extension 16' is a push button 83 which is normally urged outwardly by the spring contact 80. Secured to the movable upper tubular section 11 as by one or more of the screws 29, is a knocker arm 84 having a downturned portion arranged to engage the outer end of the button 83 when the section 11 is rotated by the receiver arm 35. The casing 16' may be provided with a suitable cover 85 enclosing the breaker switch mechanism.

Referring particularly to the wiring diagram shown in Figure 11, the switch 77 is shown in a position closing the talking circuit and opening the ringing circuit. Figure 11 also shows the spring contact 80 in an open position as when the telephone is in actual use, thus breaking the circuit to the pilot light 78 which is connected in the talking circuit and serves to indicate when the talking circuit is closed. A resistance coil 86, which may be mounted in the hollow base 5, is connected in the line to the pilot light 78. When the switch 76 is thrown to its opposite position from that indicated in Figure 11, the talking circuit will be opened and the ringing circuit closed. In this latter position of the switch 76, the circuit is also broken through the switch 76 to the pilot light 78 so that opening and closing of the breaker switch has no effect upon the pilot light. It may here be well to state that the function of the pilot light 78 is to call the operator's attention, should the operator fail to throw the switch 76 to a position closing the ringing circuit after the conversation is finished.

In operation, and assuming that the switch 76 is in a position closing the talking circuit, when the operator's ear is removed from engagement with the receiver R, the spring 30 swings the receiver arm 35 to the full line showing position of the arm in Figure 1 whereupon the knocker arm 84

engages the push button 83 and forces the button inwardly causing the spring contact 80 to engage the fixed contact 79. This closing of the contact 80 completes the circuit to the pilot light 78 indicating that the switch 76 should be thrown to the ringing circuit position. When conversation is being carried on, the switch 76 is in a position closing the talking circuit. With the talking circuit closed, the circuit to the pilot light is closed and as soon as the operator's ear is placed against the receiver R and the arm 35 swung to the left, the knocker arm 84 moves away from the button 83 and allows the pilot light circuit to be broken and remain so until the arm 35 is released and again returned to its neutral position by the spring 30, upon which the light circuit is closed and remains so until the switch 76 is thrown to the ringing circuit position. Thus the breaker switch arrangement will provide a signal light only when the receiver arm 35 is in a neutral position of non-use and prevent the light from burning during the entire time of a conversation over the phone.

Thus it will be seen that a novel and improved telephone receiver and transmitter assembly has been provided embodying features of adjustment permitting disposing of the transmitter and receiver in comfortable positions to meet the particular requirements of the user. The assembly also embodies a novel visual indicating means for indicating to the operator when the talking circuit is closed, and which indicating means is rendered inactive during the time of conversation.

Changes in detail may be made to the form of invention herein shown and described without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. In a telephone instrument of the class described, the combination of a hollow supporting standard embodying a fixed section and a rotatable section, a transmitter supporting arm adjustably supported upon the fixed section, a receiver supporting arm having a universal joint mounting in the rotatable section of the supporting standard, and spring means within the standard and normally urging the receiver supporting arm with a limited movement toward the transmitter supporting arm.

2. In a telephone instrument of the class described, a vertical supporting standard, a vertical shaft rotatably mounted at one side of the standard, an extensible transmitter supporting arm pivotally mounted upon the upper end of the shaft for vertical swinging movement, and an extensible receiver supporting arm having a ball and socket joint mounting in the standard.

3. In a telephone instrument of the class described, a base, a hollow standard mounted vertically in the base, a hollow shaft rotatably mounted at one side of the standard, a transmitter arm pivotally mounted upon the upper end of the shaft, a transmitter unit pivotally mounted upon the arm, a receiver arm having a ball and socket joint connection in the standard, and a receiver unit pivotally mounted upon the receiver arm.

4. In a telephone instrument of the class described, a base, a hollow standard mounted in the base, a hollow shaft rotatably mounted at one side of the standard, a transmitter arm pivotally mounted upon the upper end of the shaft, a transmitter unit pivotally mounted upon the arm, a receiver arm having a ball and socket joint connection in the standard, a receiver unit pivotally mounted upon the receiver arm and means within the standard for yieldably urging the receiver arm with a limited degree of movement toward the transmitter arm.

5. In a telephone instrument of the class described, a supporting standard, a shaft rotatably mounted upon one side of the standard, a transmitter arm embodying telescopically arranged tubular sections, means pivotally mounting one of the sections upon the upper end of said shaft, a transmitter unit pivotally mounted upon the outer end of the upper arm section, yieldable means for retaining the sections in adjusted positions, and a receiver supporting arm adjustably mounted in the standard for supporting a receiver unit in cooperative relation to the transmitter unit.

6. In a telephone instrument of the class described, a transmitter supporting arm embodying a pair of telescopically arranged tubular inner and outer sections, a wall at the inner end of each section, a slide rod anchored in the wall of the outer section and extending through the wall of the inner section, said rod having an enlargement at its outer end to limit outward movement of the inner section, said inner section being rotatable in the outer section, a tension spring carried by the outer section and frictionally engaging the inner section for retaining the inner section in adjusted position, and means for pivotally mounting a transmitter unit upon the outer end of the inner arm section.

7. In a telephone instrument of the class described, a supporting standard, a transmitter unit adjustably mounted upon the standard, a receiver unit arm embodying inner and outer telescopically arranged sections, means mounting the outer section with a ball and socket joint in the standard, a rack formed on the inner section, a pinion journaled upon the outer section and meshing with the rack, and a receiver unit mounting yoke pivotally mounted upon the outer end of the inner section.

8. In a telephone instrument of the class described, an extensible receiver arm embodying a square tubular section and a square bar section slidably fitting in the square tubular section, a mounting means at one end of the tube section, a rack formed on the bar section, a pinion journaled on the tube section for meshing with the rack, said bar section having a slotted outer end, a yoke pivoted upon the slotted portion of the bar section and having an end wall connecting the arms of the yoke, a supporting arm extended through the slot of the bar section and pivoted upon the pivot for said yoke, said supporting arm having a keeper portion projecting through said end wall for causing the supporting arm to swing with said yoke, and a U-shaped stop member pivoted upon the supporting arm between the arms of said yoke, the arms of said stop member to be engaged by the rear wall of a receiver pivotally mounted in the yoke arms to limit swinging movement of the receiver in the yoke.

9. In a telephone instrument of the class described, a hollow supporting standard embodying a fixed lower section and a rotatable upper section, means connecting the sections in axial alignment, a transmitter supporting arm adjustably supported from the lower section, and a receiver supporting arm adjustably mounted in the upper section.

10. In a telephone instrument of the class described, a hollow supporting standard embodying a fixed lower section and a rotatable upper section, means connecting the sections in axial align-

ment, a transmitter supporting arm adjustably supported from the lower section, a receiver supporting arm adjustably mounted in the upper section and tensioning means within the standard for yieldably rotating the upper section with a limited degree of movement in a direction for moving the receiver supporting arm toward the transmitter supporting arm.

11. In a telephone instrument of the class described, a supporting standard embodying upper and lower tubular sections, a transmitter supporting arm supported from the lower section, a coupling sleeve connecting the standard sections in axial alignment, said upper section of the standard having a circular opening and a slot extending from the opening to the upper end of the section, upper and lower ball seat members in the upper section, a receiver supporting arm having a ball at one end received between the ball seat members to project laterally from the upper standard section through said circular opening, a closure plug for the upper end of the upper section of the standard and forming an abutment for the upper ball seat member, and an expansion coil spring acting between said coupling sleeve and the lower ball seat member.

12. In a telephone instrument of the class described, a tubular supporting standard embodying a fixed lower section and a rotatable upper section, a coupling sleeve secured to the upper section and extending into the lower section, a plug in the lower section at the lower end of the coupling sleeve, a coil spring connected between said plug and the upper end of the coupling sleeve and acting to normally rotate the coupling sleeve and said upper section in one direction, means associated with the plug and coupling sleeve for limiting rotation of the sleeve by said spring, a transmitter unit supporting arm supported from the lower section of the standard, and a receiver supporting arm adjustably mounted in the upper section of the standard for movement therewith by said spring whereby the receiver supporting arm is normally urged toward the transmitter receiving arm.

13. In a telephone instrument of the class described, a supporting standard embodying upper and lower tubular sections, a supporting base securing the lower section against rotation, a transmitter unit supporting arm adjustably supported from the lower section, a coupling sleeve secured in the upper section and extending downwardly into the lower section, a plug fixed in the lower section at the lower end of the coupling sleeve and embodying a reduced cylindrical plug portion projecting into the sleeve, said reduced cylindrical plug portion having a series of radially opening threaded sockets, said coupling sleeve having a segmental-shaped slot therein where the sleeve encircles the reduced cylindrical plug portion, a screw for fitting in any of said threaded sockets with the head thereof extending into said slot for limiting rotation of the coupling sleeve, a spiral spring having one end connected to said plug and its upper end connected to the coupling sleeve to normally rotate the sleeve in one direction, and a receiver supporting arm having a universal joint connection in the upper section of the standard.

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